AFTER-FINAL RESPONSE UNDER RULE 116

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Client Reference:

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re PATENT APPLICATION of: STEVEN C. QUARRE
Application No.: 10/728,197
Confirmation Number: 7284
Group Art Unit: 3744

Filed: December 3, 2003
Examiner: EARLY, Michael Jacoby

Title: THERMALLY EFFICIENT CCD CAMERA HOUSING

AMENDMENT

Mail Stop AF
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

This response is filed within two months of the Final Office Action dated June 23rd, 2006. Please amend the above-identified application as follows:

IN THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. **(Currently Amended)** A method of cooling a charge-coupled device; said method comprising:

coupling said charge-coupled device to a cold side of a thermoelectric cooling device;

coupling a hot side of said thermoelectric cooling device to a transfer plate;

mounting said transfer plate to a thermal barrier, said thermal barrier defining a cavity thermally isolated from ~~the~~ said transfer plate, said cavity being adapted to house ~~the~~ said charge-coupled device; and

coupling said transfer plate to a heat sink.

2. (Original) The method of claim 1 further comprising interposing a spacer between said charge-coupled device and said cold side of said thermoelectric cooling device.

3. (Original) The method of claim 2 wherein said interposing comprises selectively dimensioning said spacer to maximize a surface area of contact between said charge-coupled device and said cold side of said thermoelectric cooling device.

4. (Original) The method of claim 2 wherein said interposing comprises selectively dimensioning said spacer to position said hot side of said thermoelectric cooling device in a predetermined location relative to said charge-coupled device.

5. (Original) The method of claim 1 further comprising selectively applying a conformal coating to at least one of said transfer plate, said thermal barrier, and an interface between said transfer plate and said thermal barrier.

6. (Original) The method of claim 5 wherein said selectively applying comprises providing an environmentally tight moisture barrier with said conformal coating.

7. (Original) The method of claim 1 further comprising cooling said hot side of said thermoelectric cooling device.

8. (Original) The method of claim 7 wherein said cooling comprises transferring heat generated by said thermoelectric cooling device from said charge-coupled device.

9. (Original) The method of claim 1 wherein said mounting comprises attaching said transfer plate to an epoxy laminate material.

10. (Original) The method of claim 1 wherein said mounting comprises isolating heat generated by said thermoelectric cooling device from said charge-coupled device.

11. (Previously Presented) An apparatus comprising:

a charge-coupled device mounted in a housing, said housing including a thermal barrier and a cavity for mounting said charge-coupled device;

a thermoelectric cooling device having a cold side and a hot side; said cold side coupled to said charge-coupled device;

a heat sink; and

a transfer plate coupling said hot side of said thermoelectric cooling device to said heat sink in a heat transfer relationship; said transfer plate mounted to said thermal barrier heat transfer between said thermoelectric cooling device and said housing is prevented.

12. (Original) The apparatus of claim 11 further comprising a spacer interposed between said charge-coupled device and said cold side of said thermoelectric cooling device.

13. (Original) The apparatus of claim 12 wherein said spacer is selectively dimensioned to maximize a surface area of contact between said charge-coupled device and said cold side of said thermoelectric cooling device.

14. (Original) The apparatus of claim 12 wherein said spacer is selectively dimensioned to position said hot side of said thermoelectric cooling device in a predetermined location relative to said charge-coupled device.

15. (Original) The apparatus of claim 11 further comprising a conformal coating applied to at least one of said transfer plate, said thermal barrier, and an interface between said transfer plate and said thermal barrier.

16. (Original) The apparatus of claim 15 wherein said conformal coating provides an environmentally tight moisture barrier.

17. (Original) The apparatus of claim 11 wherein said thermoelectric cooling device is a Peltier cooling device.

18. (Original) The apparatus of claim 11 wherein said transfer plate is constructed of a heat-conducting metal.

19. (Original) The apparatus of claim 11 wherein said thermal barrier is constructed of an epoxy laminate material.

20. (Original) The apparatus of claim 12 wherein said spacer is constructed of a heat-conducting metal.

21. (Previously Presented) A method of cooling a charge-coupled device, said method comprising:

providing a cavity in a housing, said cavity adapted to house said charge-coupled device;

coupling said charge-coupled device to a cold side of a thermoelectric cooling device;

coupling a hot side of said thermoelectric cooling device to a transfer plate; and

sealing said cavity, said sealing operable to provide a substantially environmentally-tight barrier for said charged-coupled device.

22. (Previously Presented) The method of claim 21 further comprising interposing a spacer between said charge-coupled device and said cold side of said thermoelectric cooling device.

23. (Previously Presented) The method of claim 22 wherein said interposing spacer between said charge-coupled device and said cold side of said thermoelectric cooling device comprises selectively dimensioning said spacer to maximize a surface area of contact between said charge-coupled device and said cold side of said thermoelectric cooling device.

24. (Previously Presented) The method of claim 22 wherein said interposing spacer between said charge-coupled device and said cold side of said thermoelectric cooling device comprises selectively dimensioning said spacer to position said hot side of said thermoelectric cooling device in a predetermined location relative to said charge-coupled device.

25. (Previously Presented) The method of claim 21 further comprising cooling said hot side of said thermoelectric cooling device.

26. (Previously Presented) The method of claim 25 wherein said cooling comprises transferring heat generated by said thermoelectric cooling device from said charge-coupled device.

27. (Previously Presented) The method of claim 21 wherein said sealing comprises applying a conformal coating.

28. (Previously Presented) The method of claim 21 wherein said sealing is operable to prevent moisture from penetrating said cavity.

29. (Previously Presented) The method of claim 21 further comprising interposing a thermal barrier between said housing and said transfer plate.

30. (Previously Presented) The method of claim 29 wherein said thermal barrier is constructed of an epoxy laminate material.

31. (Previously Presented) The method of claim 29 wherein said interposing comprises isolating heat generated by said thermoelectric cooling devise from said charged-coupled device.

32. (Previously Presented) An apparatus comprising:

a housing having a cavity defined therein, said cavity operative to mount a charge-coupled device;

a thermoelectric cooling device having a cold side and a hot side, said cold side coupled to said charge-coupled device;

a heat sink;

a transfer plate coupling said hot side of said thermoelectric cooling device to said heat sink in a heat transfer relationship; and

a conformal coating, said conformal coating operable to provide a substantially environmentally tight barrier for said charge-coupled device.

33. (Previously Presented) The apparatus of claim 32 further comprising a spacer interposed between said charge-coupled device and said cold side of said thermoelectric cooling device.

34. (Previously Presented) The apparatus of claim 33 wherein said spacer is selectively dimensioned to maximize a surface area of contact between said charge-coupled device and said cold side of said thermoelectric cooling device.

35. (Previously Presented) The apparatus of claim 33 wherein said spacer is selectively dimensioned to position said hot side of said thermoelectric cooling device in a predetermined location relative to said charge-coupled device.

36. (Previously Presented) The apparatus of claim 32 wherein said thermoelectric cooling device is a Peltier cooling device.

37. (Previously Presented) The apparatus of claim 32 wherein said transfer plate is constructed of a heat-conducting metal.

38. (Previously Presented) The apparatus of claim 32 wherein said conformal coating is operable to prevent moisture from penetrating said cavity.

39. (Previously Presented) The method of claim 32 further comprising interposing a thermal barrier between said housing and said transfer plate.

40. (Previously Presented) The method of claim 39 wherein said thermal barrier is constructed of an epoxy laminate material.

41. (Previously Presented) The method of claim 39 wherein said interposing comprises isolating heat generated by said thermoelectric cooling devise from said charged-coupled device.